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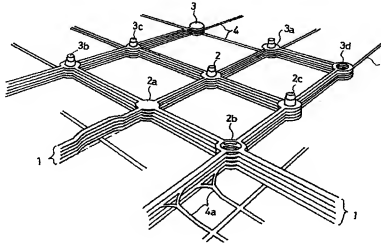

(57) Abstract: Disclosed is a multi-layer road system, which has multilevel roads composed of at least two floors with an inter-floor road for securing parking and living spaces and/or without the inter-floor road for minimizing the height thereof, entry/exit buildings provided at starting points of the multilevel roads, and intersection buildings provided at the intersection points between the multilevel roads. A planar layout structure of the multilevel road is based on a combination pattern, in which non-latticed type multilevel roads including intermediate entry/exit buildings are connected to each other by linear and curved multilevel roads. The floors of the intersection building enable a rapid and easy left-hand turn by substituting a P-turn mode for a conventional mode requiring a turn of 180° along a loop road.

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MULTI-LAYER ROAD SYSTEM

Technical Field

The present invention relates to a multi-layer road system as an urban infrastructure in which roads are vertically laid one above another and organically connected to each other.

Background Art

Generally, in view of the actual circumstances that it is practically difficult to quantitatively control traffic volume despite of a sharp rise in the traffic volume with increasing of traffic demand, the traffic problem is very serious in an overcrowded traffic area or a heavy traffic area including a big city and the like.

Although an effort has been conventionally made to solve the traffic problem by constructing a subway or a single-level elevated road to which grade crossings and grade separated crossings are added, there is a limit to take measures to relieve a traffic jam having been already deepened or growing worse, or to secure parking spaces.

A series of researches and analyses as well as phenomenal results have proved that it is difficult to manage a traffic system by an artificial control because traffic hindrance, for example, in one big city arises from the traffic jam caused by the increase in traffic demand due to a complex and interdependent life style between all of life zones including a downtown, suburbs,

satellite towns, long-distance hinterlands and so on, and thus the traffic problem cannot be solved by expanding and newly establishing roads on the ground surface whose absolute area is fixed because the ground surface must be maintained, preserved and utilized as natural, environmental, industrial and living spaces to thereby localize the extension and new-establishment of roads.

If such a situation lasts, not only urban functions will be stagnated and even paralyzed, but also lowering in social productivity and living quality will be weighted more and more.

Considering this traffic problem, there have been developed a variety of techniques for essentially solving the traffic jam by structuring available traffic lot surfaces in a multilevel pattern to secure sufficient traffic routes and organically operating the traffic routes in conjunction with each other as well as surrounding traffic routes and background traffic routes.

The above techniques are directed to organically composing a vertically stacked multilevel road in the overcrowded traffic area or the heavy traffic area, which is a system for constructing a complex urban structure of a multilevel concept on the basis of the multilevel road. This multilevel road system consists of three basic components of multilevel roads, entry/exit buildings and intersection buildings. The multi-level roads are combined with each other in a latticed pattern, the intersection buildings are disposed at the

combined points, and the entry/exit buildings are disposed at the entry/exit points of the multilevel roads.

More particularly, the respective multilevel roads are composed of at least two floors between which an inter-floor road is formed, respectively to secure parking spaces and living spaces, the respective entry/exit buildings are provided at each starting point of the multilevel roads, that is, each connection point of the multilevel roads with general roads and are formed with at least two floors on which it is possible to run in at least one direction, and the respective intersection buildings are provided at each intersection point between the multilevel roads and are formed with at least two floors on which it is possible to run in all direction. The first floor of the intersection building passes at least one first level roads through the underground or semi-underground so as to enable going-straight including a U-turn or vehicles authorized to drive on the first level roads are highly restrained and simultaneously only urgent and protocol vehicles such as an ambulance or the like are allowed to pass the first level roads, and a loop road for making one-way turn in a counterclockwise direction, a detour road and an elevation road are installed on the first floor. The floors above the second floor of the intersection building takes the grade separated crossing mode and includes the construction of the first floor, and vehicle stops giving priority to mass transportation such as a bus and so forth are provided on the first and

second floors.

Even if each floor of the intersection building takes the grade separated crossing mode in the above-mentioned multilevel road system, however, such a grade separated crossing mode has a problem in a moving line of vehicle.

That is, the elevation road of each floor connects the loop roads between the respective floors, the detour road (hereinafter referred to as a detour only road) connects the loop road with the going-straight road, and a connecting road is connected between the loop road and the inter-floor road (hereinafter referred to as an inter-floor connection road). Consequently, there is a problem in that a course for a left-hand turn from one going-straight road to another going-straight road crossing the former is substantially long because such a left-hand turn inevitably requires to enter the detour only road, go a long distance round along the loop road and then enter the going-straight road to be desired to enter there through other detour road located in a diagonal direction from the going-straight road into which an entry has been made earlier. In other words, although two detour roads are used for the left-hand turn, the left-hand turn is possible only by turning around the loop road to an extent of nearly 180°.

Also, a rooftop floor located on the top of the multilevel road is so planed that it is used as a runway for light flying vehicles and the like while serving as a roof of the multilevel road, but there is still left room of necessity for utilizing the rooftop floor

section because this rooftop is established over all sections of the multilevel road. Since the above techniques simply exemplify a case of placing a building on the intersection building and make no mention of a way to utilize spaces above and around the rooftop floor building and to link the spaces with each other in that case, there can be some doubt about its practicality. This problem of constructing the building on the rooftop floor of the multilevel road is very important to a relation between the urban structure and the multilevel road to be intended by the present invention.

Disclosure of the Invention

Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and a main object of the present invention is to seek a drastic solution to a traffic jam by structuring limited available traffic lot surfaces in a multilevel pattern to secure sufficient traffic routes and organically operating the traffic routes in conjunction with each other as well as surrounding traffic routes and background traffic routes.

Another object of the present invention is to provide a multilevel road system making it possible to rapidly and easily make a left-hand turn by substituting a P-turn mode for a conventional grade separated crossing mode employed in each floor of an intersection building and requiring a turn of 180° along a loop road section.

Still another object of the present invention is

to provide a multilevel road system enabling an eco-friendly and planned urban structure based on the multilevel road as a living foothold to be obtained by efficiently accommodating buildings on a rooftop floor of the multilevel road and patterning a layout structure of the multilevel road.

Further still another object of the present invention is to provide a multilevel road system making it possible to run constantly in a desired travel direction on multi-axial integrated roads without any standby due to a traffic signal, any waiting for non-protective turn or the like.

In another aspect of the present invention, a main object of the present invention is to provide a multilevel road system which prevents living and habitat environments including residential areas, industrial areas, farmlands, natural areas, ecologic areas and so on from being destroyed and invaded from an extended viewpoint of environmental preservation and restoration centered on pedestrians, residents and human-beings together with a preservation and restoration thought for animal and plant ecosystems, makes the residents free of neighbor areas and connects animal, plant and insect ecosystems with each other.

To achieve these objects, there is provided a multilevel road system in accordance with the present invention, the system comprising: multilevel roads composed of at least two floors between which an inter-floor road is formed, respectively for securing parking spaces and living spaces; entry/exit buildings provided

at each starting point of the multilevel roads and formed in a manner making it possible to run in at least one direction; and intersection buildings provided at each intersection point between the multilevel roads and formed in a manner making it possible to run in all of upper, lower, left-hand and right-hand directions, wherein a planar layout structure of the multilevel road is composed on the basis of a combination pattern in which there is included intermediate entry/exit building so formed as to make it possible to enter the roads at the middle thereof and to run in two directions and non-latticed type multilevel roads including opened and closed loops are connected with each other by linear and curved multilevel roads, and wherein the multilevel road system can be formed without laying the inter-floor roads.

The above-mentioned multilevel road including the entry/exit buildings and the intersection buildings are composed in a various planar layout structure so as to provide a road sphere close-packed urban structure having various belt shapes for the purpose of forming a living zone along the multilevel road. Such a planar layout structure may be optionally or compositely composed by a structure in which radiant lines and lines of at least two concentric circles or the like meet each other, a honeycomb structure consisting of a plurality of polygons, a ring structure in which a plurality of circular loops are connected each other by straight lines and a combination structure thereof. These structures partially include the opened loops.

In the intersection building formed in such a manner that it is possible to enter and exit between going-straight roads of the respective floors through loop roads and detour only roads, the detour only roads connecting the respective going-straight roads and the loop roads are provided with a left-hand turn only shoulder formed in a manner to enable a P-turn to the loop road through the shoulder, elevation roads enabling vehicles to elevate from all directions are formed between the loop roads of the respective floors, and inter-floor connection roads are formed between the loop road and the inter-floor road.

Also, buildings can be built on the top floors and sides of the multilevel roads, and the plurality of buildings built on the top floor of the multilevel roads are so linked with each other that top surfaces thereof have a constant height and thus overhead runways capable of a takeoff and landing of light flying vehicles can be constructed over the building group.

In this way, most living spaces are formed along the multilevel roads, thus rendering it possible to build a variety of facilities more closely accessible to the natural environment in spaces other than the road sphere and to preserve and newly construct forests, rivulets and farmlands.

Brief Description of the Drawings

The above and other objects, features and advantages of the present invention will become more apparent from the following detailed description taken

in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view showing an overall construction of a multilevel road system in accordance with the present invention;

Fig. 2 is a schematic perspective view showing organic combination of multilevel roads, entry/exit buildings and intersection buildings in accordance with the present invention;

Fig. 3 is a view showing a model in which the multilevel roads in accordance with the present invention are arranged in a radiant pattern;

Fig. 4 is a view showing a model in which the multilevel roads in accordance with the present invention are arranged in a honeycomb-like pattern;

Fig. 5 is a view showing a model in which the multilevel roads in accordance with the present invention are arranged in a ring-like pattern;

Fig. 6 is a perspective view of an intersection building in accordance with one embodiment of the present invention;

Fig. 7 is a schematic perspective view illustrating a four-way intersection building with a rooftop floor in accordance with the present invention;

Fig. 8 is a plan view of the intersection building in accordance with the present invention, which illustrates how a left-hand turn is carried out using a left-hand turn only shoulder;

Fig. 9 is a perspective view showing the first floor of the intersection building in accordance with one embodiment of the present invention;

Fig. 10 is a perspective view showing floors above the second floor of the intersection building in accordance with one embodiment of the present invention;

Fig. 11 is a perspective view showing the second floor through which a track vehicle passes in accordance with one embodiment of the present invention;

Fig. 12 is a schematic perspective view of the intersection building consisting of only loop roads and elevation roads in accordance with another embodiment of the present invention;

Fig. 13 is a perspective view of the second floor of the intersection building shown in Fig. 12;

Fig. 14 is a schematic perspective view of the intersection building whose elevation roads are treated outward without parking spaces in accordance with another embodiment of the present invention;

Fig. 15 is a schematic perspective view of the intersection building forming a square without the parking spaces in accordance with another embodiment the present invention;

Fig. 16 is a view illustrating a case model in which buildings are built on the multilevel roads in accordance with the present invention;

Fig, 17 is a perspective view of the intersection building in a system having no inter-floor road in accordance with another embodiment of the present invention;

Fig. 18 a plane view of an essential part of a T-shaped crossing road shown in Fig. 17;

Fig. 19 is a plan view of an essential part of a

Y-shaped crossing road shown in Fig. 17;

Fig. 20 is a schematic constructional view of an essential part of the road linked with a natural eco-environment area in accordance with the present invention;

Fig. 21 is a perspective view of another embodiment of Fig. 17;

Fig. 22 is a schematic constructional view of an essential part of an entry/exit road in accordance with the present invention;

Fig. 23 is a schematic constructional view of an essential part of another entry/exit road in accordance with the present invention;

Fig. 24 is a perspective view showing one embodiment of modular construction of a building type structure such as an apartment to be connected with the present invention; and

Fig. 25 is a perspective view showing one embodiment of eco-friendly construction of the building type structure such as the apartment to be connected with the present invention.

Best Mode for Carrying Out the Invention

Hereinafter, preferred embodiments of the present invention will be described with reference to the accompanying drawings. In the following description and all drawings, the same reference numerals are used to designate the same or similar components, and so repetition of the description on the same or similar components will be omitted.

FIG. 1 is a perspective view showing an overall construction of a multilevel road system in accordance with the present invention, Fig. 2 is a view showing a latticed layout structure of the resent invention, and Figs. 3 to 5 are views showing a model in which the multilevel roads of the present invention are arranged in a radiant pattern, a honeycomb pattern and a ring pattern, respectively.

Fig. 2 shows a state that the multilevel roads 1 are connected with each other in a latticed pattern by intersection buildings 2, 2a, 2b, 2c and entry/exit buildings 3, 3a, 3b, 3c, 3d.

In the case of Fig. 2 illustrating the latticed layout pattern, the intersection buildings 2, 2a, 2b, 2c are located at points crossing the multilevel roads 1 in at least three directions. Among the intersection buildings, the intersection buildings 2, 2a, 2b are located at points crossing the multilevel roads 1 in four directions and the intersection building 2c is located at a point crossing the multilevel roads 1 in three directions.

Detailed parts of the intersection building 2 corresponding to a basic model will be described later in conjunction with Figs. 6, 10 and 11.

The intersection buildings 2a, 2b are proposed as types of the intersection building in accordance with other embodiments of the present invention and located in an area having relatively smaller traffic volume than an area in which the intersection building 2 as the basic model is located.

Detailed parts of the intersection building 2a will be described below in conjunction with Figs. 12 and 13.

Also, detailed parts of the intersection building 2b will be described below in conjunction with Figs. 14 and 15. The intersection building 2c is proposed as a type of the intersection building in accordance with an embodiment crossing from three directions and a crossing type from at least five directions is not shown in the drawings.

The entry/exit buildings 3, 3a, 3b, 3c, 3d are located at meeting points between the multilevel roads 1 and general roads 4. In Fig.2, an entry/exit building 3 connected with one multilevel road 1, entry/exit buildings 3a, 3d connected with the multilevel roads 1 from two directions and entry/exit buildings 3a, 3c connected with the multilevel buildings 1 from three directions are shown.

The respective entry/exit buildings 3, 3a, 3b, 3c, 3d are connected with the general road 4.

Detailed parts of the respective entry/exit buildings 3, 3a, 3b, 3c, 3d will be fundamentally described later in conjunction with Figs, 12 and 13, but the entry/exit buildings 3d, for example, may follow models according to descriptions of Figs. 14 and 15 and the entry/exit buildings 3b, 3c may follow models according to descriptions of Figs. 12 and 13 while partially following models according to descriptions of Figs. 6, 10 and 11.

In particular, Fig. 2 assumes that a track vehicle

passes through the intersection building 2 and the entry/exit building 3c intermediately passing in a transverse direction and through the multilevel roads 1 connected with those buildings, by reason of which the detailed parts of the entry/exit building 3c partially follow the model according to Fig. 11.

As the result of this, the intersection building 2 is located in an area having relatively larger traffic volume and the intersection buildings 2a, 2b other than the intersection building 2 and the entry/exit buildings 3, 3a, 3b, 3c, 3d are located in an area having relatively smaller traffic volume.

The present invention includes a radiant layout in addition to the above-mentioned latticed layout.

In the case of Fig. 3 illustrating the radiant layout structure, the multilevel roads are arranged in such a manner that three concentric circles having certain radii from a core (axis) of a downtown meet the respective radiant lines. A three-way intersection building C1 or a four-way intersection building C2 is erected at these meeting points between the concentric circles and the radiant lines. Under the radiant layout structure, the concentric circles are not always given in a constant format, but a format including at least two concentric circles or variants equivalent thereto, for example, a format partially combined honeycombs or rings may be included in accordance with topographies or regional characteristics. Fig. 3 illustrates intermediate entry/exit buildings C3 so formed as to make it possible to enter the roads at the middle

thereof and to run in two directions and provided at proper positions as needed.

In the case of Fig. 4 illustrating a honeycomb-like layout structure, the multilevel roads taking a plurality of polygonal shapes are continuously formed in all directions. The polygonal shape includes a triangular shape, a rectangular shape, a pentagonal shape, a hexagonal shape, a double wave shape or the like and the multilevel roads take a combination of these polygonal shapes. Portions forming sides of the polygon include a curved line and the three-way intersection building C11 or the four-way intersection building C21 is erected in meeting points of the respective sides. This structure is the most suitable form for being applied to the existing urban structure in which axes of downtown are decentralized into various directions. Fig. 4 illustrates the intermediate entry/exit buildings C3 so formed as to make it possible to enter the roads at the middle thereof and to run in two directions and provided at proper positions as needed.

In the case of Fig. 5 illustrating a ring-like layout structure, a planned city in which the axes of downtown are uniformly decentralized is shown. Every multilevel road forming a circle is provided with the axes and the circles are connected with each other by means of the linear or curved multilevel roads. The ring-like layout structure includes at least two circles. Fig. 5 illustrates the intermediate entry/exit buildings C3 so formed as to make it possible to enter

the roads at the middle thereof and to run in two directions and provided at proper positions as needed.

Fig. 6 proposes basic models of the multilevel road 1 and the intersection building 2. The multilevel road 1 is formed with the first level road 5, the second level road 6, the third level road 7, the fourth level road 8, a rooftop floor on the top thereof, an inter-floor road 10 between the second and third level roads 6, 7, an inter-floor road 10a between the third and fourth level roads 7, 8 and an inter-floor road 10b between the fourth level road 8 and the rooftop floor 9. In principle, the first level road 5 is horizontal to the ground surface.

The first level road can be maintained at a certain height from the ground surface as needed so that the ground surface may become spaces for securely functioning as an ordinary total living space and giving conveniences to citizens.

In general, a guideline is so given as to allow public/urgent vehicles, heavy freight transportation vehicles, special vehicles and commercial mass transit vehicles to run on the first level road 5, allow express buses, track vehicles, light freight transportation vehicles and passenger vehicles to run on the second level road 6 and allow only passenger vehicles to run on the third and fourth level roads 7, 8.

Connecting roads 4a can be installed at necessary points on the first level road 5 and the roads above the second level road 6 so as to raise their utility linked with the surrounding general roads 4.

Also, in addition to parking spaces on the respective inter-floor roads 10, 10a, 10b, an office street and a shopping street can be formed on the inter-floor road 10 between the second level road 6 and the third level road 7, and office streets and sports/leisure streets can be formed on the inter-floor road 10a between the third level road 7 and the fourth level road 8 and the inter-floor road 10b between the fourth level road 8 and the rooftop floor 9.

In principle, the respective level roads 6, 7, 8 including the first level road 5 cross each other in a free-pass mode within the intersection building 2 and enable a going-straight, a right-hand turn, a left-hand turn, a U-turn and a running between the upper and lower floors within the intersection building 2 or through the outline thereof,

With regard to the U-turn, it is performed after entry into the intersection building 2, at a point of the going-straight and, if necessary, the first lane or a separately divided U-turn only lane at a middle point of the multilevel road section, or through the loop road 11 of the intersection building 2 in the same manner as the case of the left-hand turn.

In the intersection building 2 corresponding to crossing points between the respective level roads 6, 7, 8, loop roads 11 for making one-way turn in a counterclockwise direction are formed to permit the right-hand turn, the left-hand turn, the U-turn, the up and down running, the parking, the entry, the exit or the like. A detour road 12 is connected between the

respective level roads 6, 7, 8 and the loop roads 11, respectively and a connecting road is connected between the respective inter-floor roads 10, 10a, 10b and the loop roads 11, respectively in a similar way to the detour road 12.

Since the inter-floor roads 10, 10a, 10b are formed at an intermediate height between the respective level roads 6, 7, 8 and the loop roads 1 are formed at the same height as that of non-crossing portions of the respective level roads 6, 7, 8, the connecting road 13 is inherently inclined at a certain angle.

As shown in Fig. 9, the crossing point between the first level roads 5 in the intersection building 2 is of a free-pass type in which one of the first level road 5 passes through straightly and horizontally to the ground surface, the other passes through straightly by way of the underground, the loop road 11 for making one-way turn in the counterclockwise direction is formed at a crossing point between both of the first level roads 5, and the detour roads 12 are connected between the loop road 11 and the first level roads 5.

Thus, the loop road 11 laid between the first level road 5 passing through straightly and horizontally to the ground surface and the first level road 5 passing through straightly via the underground passes through above the ground.

Elevation roads 13 for connection with the loop road 11 of the second level road 6 are internally formed at both ends of the loop road 11 while being inclined at a certain angle.

These elevation roads 13 are aimed for transit between the upper and lower floors, consist of two road of a descent only road and an ascent only road, and enable vehicles making a detour along the loop road 11 to directly elevate only by a lane change.

On the other hand, the intersection building 2 is provided as a four-way intersection building as shown in Fig. 17.

Only the multilevel roads 1 are shown in Fig. 17, such a multilevel road 1 is formed with the second to fifth level roads 40, 42, 44, 46, and the inter-floor road as shown in Fig. 6 is omitted.

Connecting roads 50, 50a, 52, 52a, 54, 54a free to ascend and descend are formed between the second level road 40 and the third level road 42, the third level road 42 and the fourth level road 44, and the fourth level road 44 and the fifth level road 46, respectively. Also, multilevel crossing roads are formed between the respective crossings so as to be able to change running directions. Now, a description of the left- and right-hand turn for changing directions will be given.

With regard to the right-hand turn, it is realized by going along the roads in a direction of W → S, N → W, E → N or S → E. With regard to the left-hand turn, it is realized by going from a starting point of W toward N by way of the crossing road A or passing through N and then making a U-turn at a preset point toward E, going from a starting point of N toward E and then making a left-hand turn or a U-turn by way of the crossing road B, going from a starting point of E toward S and then making a U-

turn by way of the crossing road C, or going from a starting point of S toward W and then making a U-turn by way of the crossing road D.

Fig. 18 is an enlarged plan view of an essential part of a T-shaped crossing road in Fig. 17, into which an entry can be freely made by a going-straight, a left-hand turn and a right-hand turn without a signal system. In this crossing road, a running on the left-hand turn of N → E is guided via a right-hand road and a running on the left-hand turn of E → S is guide using a spiral road 60. Also, changing directions on the right-hand turns of S → E and E → N is freely performed using the connecting roads.

Fig. 19 is an enlarged plan view of an essential part of a Y-shaped crossing road in Fig. 18, in which the right-hand turn is realized by entering the connecting road in a direction designated by each arrow, but changing directions on the left-hand turn is realized by making a P-turn using a spiral road or the like.

Herein, an over-bridge is provided in the crossing portion between the roads to freely cross the crossing roads each other. To prevent this over-bridge from being collided or invaded by the road structure, points at which the over-bridge between the adjacent floors is formed are maintained apart from each other at a required distance when seen in a plan view.

Fig. 20 shows a configuration of a road linked with a natural eco-environmental area in accordance with the present invention.

This road linked with the natural eco-environmental area is constructed in an elevated road type 60, an over-bridge type 62 and an underpass type 64 at every constant interval in preset sections so as to maximally recover a limitation to residence, occupation and passage activities of residents and passers and drastically improve interception and separation between eco-spaces and habitat spaces for animals and plants, thus promoting preservation and restoration of the ecosystem. Besides, the ground surface is firstly secured and maintained habitat spaces for the residences, passers, animals and plants, or the road is laid on the ground, but there is installed a sort of eco-bridge 66 such as an over-bridge across the road or an eco-connecting road, a pedestrian road and a small/large tunnel 68 penetrating though a base of the road, thereby rendering it possible to apply the present invention not only to residential, industrial, cultural activity and overpopulated areas, but also even to environmental preservation and restoration of the natural ecosystem.

With regard to dimension of the facilities, the eco-bridge having a width of at least 100 m or the elevated road, the over-bridge or the underpass having a length of at least 100 m is formed per unit of 2 km in the case for big animals.

A communicating port or the eco-bridge having a width of 10 to 20 m is formed per unit of 500 m in the case for small animals, and the communicating port or the eco-bridge having a width of 3 m is formed per unit

of 200 m in the case for insects and microorganisms.

Fig. 21 is another variant embodiment with respect to Fig. 17, in which connecting roads 60, 62, 64, 66 are formed in a ring-like shape and ascent/descent between the respective floors is performed by connecting roads 72, 72a, 74, 74a, 76, 76a, 82, 82a, 84, 84a, 86, 86a freely accessible thereto.

Fig. 7 is a schematic perspective illustrating a four-way intersection building with a rooftop floor in accordance with the present invention. The intersection building 2 is basically formed at a crossing point between the multilevel roads 1, and the multilevel road 1 is basically formed with the first floor 5, the second floor 6, the rooftop floor 7 and inter-floor roads 10, 10a between the respective floors for providing shopping streets and parking spaces. The intersection building 2 has loop roads 11, 11a so connecting going-straight roads of the respective floors with each other as to enable left- and right-hand turns and detour only roads 12. Also, elevation roads 13 are formed between the loop roads 11, 11a of the respective floors in such a manner that vehicles can ascend and descend from all directions unlike the conventional elevation road, and inter-floor connection roads 14 are formed between the loop roads 11, 11a and the inter-floor roads 10, 10a.

Fig. 8 is a plan view of the intersection building 2 in accordance with the present invention, which illustrates how a left-hand turn is carried out using a left-hand turn only shoulder 15. In the drawing, moving lines of vehicle are designated by arrows.

Unlike the conventional intersection building, this intersection building 2 is formed in such a manner that the left-hand turn only shoulders 15 connecting the respective going-straight roads A, B with the loop road 11 are provided on the detour only roads 12 to make a P-turn to the loop roads 1 through the left-hand turn only shoulders 15. A right-hand turn can be rapidly made using the detour only roads 12 and a left-hand turn can be also rapidly made. That is, the left-hand turn is realized by entering the left-hand turn only shoulder 15 prior to completely passing through the loop road 11 and turning 270° along the opposite roadside lane of the only detour road 12, i.e., the left-hand turn only shoulder 15 immediately after passing through the loop road 11. If so, it is required only to enter the loop road by making a right-turn along the left-hand turn only shoulder 15 and then immediately the left-hand turn only shoulder 15 of the going-straight road B to be desired to enter.

In addition, as a part of a mode of making a left-hand turn on the going-straight road having smaller traffic volume, a U-turn section can be provide at a point past the loop road to permit a U-turn directly from the first lane. In the case of the intersection building having larger traffic volume, a first stop line or a signal light is disposed at a meeting point between the detour only roads 12 and the lop road 11 to prevent a tangle of vehicles making a right-hand turn along the detour only roads 12, making a left-hand turn according to the above-mentioned mode and entering the inter-floor

road 10, 10a through the inter-floor connection road 16.

Fig. 10 shows a crossing point of the floor above the second floor within the intersection building 2 applicable in the case of no track vehicle.

This is also applicable to the third and fourth level roads 7, 8, but a description will be given on the basis of the second level road 6. The crossing point as the second level road 6 within the intersection building 2 takes a grade separated crossing mode.

At least one of the second level roads 6 crossing each other forms an elevated road, and the crossing point thereof is formed with a loop road 11 and detour only roads 12.

Crossing points of the first, second, third and fourth level roads 5, 6, 7, 8 within the intersection road 2 having been described until now form the first, second, third and fourth floors 17, 18, 19, 20, respectively.

Elevation roads 13 consisting of descent and ascent only roads are formed between the lop roads 11 of the respective floors 17, 18, 19, 20. Unlike the first floor 17, the second, third and fourth floors 18, 19, 20 is provided with the elevation roads 13 vertically formed so as to be connected with the upper or lower floor even if the elevation road 13 is the descent only road or the ascent only road.

In the respective floors 17, 18, 19 20, there is created a space 22 except area of the roads, one side of which transportations connecting the upper and lower floors and accessory building facilities, that is,

stairs, elevators, vehicle elevators, water supply/sewerage systems, vertical and horizontal tunnel connecting telecommunication lines with each other, and parking space in part.

Also, the first and second floors 17, 18 are provided on the roadsides thereof with bus stops. In the case of the first floor 17, an underground sidewalk or a ground sidewalk makes it possible to go across the first level road 5 passing through horizontally, and elevating stairs and elevators is connected from the roadside of the first level road 5 descending and passing straightly to the first level road passing through straightly and horizontally, so that the roadside and the underground at the middle of the space 22 can be provided with the stops, respectively. In the case of the second floor 18, the roadsides of the second level road 6 passing straightly and horizontally and the overhead second level road 6 above the former second level road can be provided with the stops.

In the latter case, a crosswalk overpass must be laid on the second level road 6 passing through straightly and horizontally, and elevating stairs and elevators must be installed between the roadsides of the overhead second level road 6 and the second level road 6 passing through straightly and horizontally.

The same pattern as stated above is also applied to the case of the floors above the third floor above.

In Fig. 11 illustrating such a case, the second floor 18 through which track vehicles pass is shown.

A basic construction of that case is the same as

that described in Fig. 10 except that platforms 25 for riding on the track vehicles and elevating stairs and elevators for ascending and descending the platform 25.

In the so constructed intersection building 2, there is erected on the rooftop floor 9 buildings 26 which can be utilized as a variety of living spaces including business, residence, culture, sports, shopping spaces or the like and parking spaces.

For optimal use of the parking spaces provided by the upper buildings 26, loop roads permitting only one-way turn in a counterclockwise direction is provided, elevation roads 14 are connected between the top floor of the intersection building 2 and the respective floors of the upper building as well as between the respective floors themselves, and vehicle elevators can be installed.

In that case, the parking spaces 24 and accessory facilities thereof can be formed at the middle of the space 22 as shown in Fig. 12.

Hangars 27a and takeoff/landing fields 27 for helicopters can be installed around the upper buildings 26 of the intersection building 26, that is, portions connected with the rooftop floor of the multilevel road 1, and the helicopter takeoff/landing fields 24a can be also installed on rooftops of the upper buildings.

The multilevel road 1 having been described until now can be different in the number of floors from each other depending on regions, and the inter-floor road 10, 10a, 10b and the rooftop floor can be selectively permitted or not according to regional situation.

The intersection building can be formed in a pattern indicated by reference numeral "2a", "2b" or "2c" other than that indicated by reference numeral "2" as shown in Fig. 2.

Fig. 12 reflects the case of the intersection building 2a in which ascent only and descent only elevation roads 13 for elevating vehicles between the upper and lower floors are formed inside of loop road 11a for one-way turn in a counterclockwise direction, respectively, and parking spaces are formed at the middle of the loop road 11a.

Herein, bus stops (platform) 25 are provided at outer edge portions of the loop road 11a on the second floor 18 or the first floor 17, and crossing between the parking spaces 24 and the bus stops 25 is performed by a underground sidewalk in the case of the first 17 and by an overpass in the case of the second floor 18.

This loop road 11a takes a grade crossing mode capable of being provided in an area having smaller traffic volume, and can be formed with transportations connecting the upper and lower floors and accessory building facilities on one side of the parking spaces as stated in Fig. 11.

In the case of the intersection building 2b, each floor 17, 18, 19, 20 consists of only a loop road 11b of a grade crossing mode and elevation roads 13 connecting the loop road 11b of the respective floors with each other as shown in Fig. 15.

In that case, one side of the loop road 11b of the first floor 17 passes through the underground, the loop

road 11b of the floors above the second floor 18 is formed with arched portion 21 with large spacing from each other, a gateway 23 is formed in a lower portion of the second floor 18, and a square 28 is formed inside of the loop road 11b of the fires floor 17.

The inner square can be utilized as a meeting place, an athletic sports field, a park, etc., and the arched portions are formed in order to raise a visual effect on an entrance of the above-purpose spaces and to strengthen linkage function with surrounding areas.

If the above-mentioned side of the loop road 11b of the first floor 17 is laid on the ground, an arched portion can be formed on that side.

Fig. 14 shows another embodiment applicable to the intersection building 2b, which has loop roads 11b permitting only one-way turn in a counterclockwise direction as in Fig. 15. This embodiment is effective in the case of the loop road 11b having a relatively small radius because means for connecting the loop roads of the respective floor with each other is formed by outer S-shaped elevation road 13 and thus a degree of inclination of the loop road is relieved.

On the other hand, all floors of the entry/exit buildings 3, 3a, 3b, 3c, 3d as shown in Fig. 2 take a grade crossing mode composed of at least two floors capable of at least one-way running because they are fundamentally connected with the general roads 4.

That is to say, the entry/exit building 3 is an example in which the general roads 4 are ingressive from three directions and connected with one-way multilevel

road 1, the entry/exit building 3a is an example in which the general roads 4 are ingressive from two directions and connected with two-way multilevel roads 1, the entry/exit buildings 3b, 3c are an example in which the general road 4 is ingressive from one directions and connected with three-way multilevel roads 1, and the entry/exit building 3d is an example in which the general road 4 is ingressive from one directions and connected with two-way multilevel roads 1,

Since the entry/exit building 3, 3a, 3b, 3c, 3d is installed in areas having small traffic volume, they take the same crossing mode as the intersection building 2 and can be realized only by simple loop roads 11a, 11b.

The loop road makes it rule to permit one-way turn in a counterclockwise direction, and thus it is possible to enter a concerned route by changing traffic lanes irregardless whether the crossing point within the entry/exit building formed by the general road 4 is a three-forked road or a crossroad.

In the case of the entry/exit building 3 in Fig. 2, the floors above the second floor are up- and downwardly connected with each other in the same way as in Figs. 12 and 14, and the first or second floor is treated in such a way as in Fig. 7. This is the same to the cases of the entry/exit buildings 3a, 3b, 3c, 3d.

Only in the case of the entry/exit building 3c, the second floor can be treated in such a way as in Fig. 11 because track vehicles pass thorough the second floor. At this time, the first floor can be also treated

in such a way as in Fig. 3.

The entry/exit building 3d is the same in its pattern as in Fig. 14 or 15. The entry/exit building 3, 3a, 3b, 3c, 3d and the inter-floor road 10, 10a, 10b are connected with each other by the connecting road 13 as in Fig. 6.

In the above detailed description, "permitting only one-way turn in a counterclockwise direction" or "the loop raid making it rule to permit one-way turn" is limited to a right-hand running area of vehicles on crossing and up and down running directions on the loop road are reversed in a left-hand area.

Fig. 16 shows a case in which multipurpose buildings are built on and by the multilevel roads. A plurality of buildings can be built on the top floor, that is, the rooftop floor of the multilevel building to form, for example, a building group F1 around the intersection building C, and another building group F2 accessible to the multilevel road R (linkable) can be built on either side of the multilevel road R over all sections of the multilevel road R. Particularly, when the buildings are linked with each other on both sides of the intersection building C, overhead takeoff/landing ways 30 can be erected by rendering a height of the buildings constant and connecting rooftops of the buildings with each other. In that case, the overhead takeoff/landing ways 30 can be used as runways for light flying vehicles. Also, a square or a rest park can be constructed or conveniences can be installed on the rooftop floor P of the intersection building C past by

the overhead takeoff/landing ways 30

Fig. 22 illustrates a construction of an essential part of an entry/exit road in accordance with the present invention. The entry/exit road 4 and the multilevel road 1 are so connected with each other as to sequentially ascend and descend and so the respective floors of the multilevel road can be organically used by freely elevating the floors during a running.

Fig. 23 shows the entry/exit road 4 and the closed multilevel road 1, in which the multilevel road is closed at a starting point of the entry/exit road.

Fig. 24 is an exemplified perspective view showing modular construction of a building type structure such as an apartment to be connected with the present invention.

A basic structure 70 of the building is constructed by a conventional way, one or two of the respective households or rooms is or are partially or totally pre-manufactured as one unit 72 and then each unit is introduced into and assembled to the basic structure to complete the building. Accordingly, a construction period is shortened and a construction cost is lowered in an apartment, an officetel, a lodgment building such as a hotel, business building and other building to which the present invention is applied, an indoor spatial structure and an interior design of those buildings can be diversified, and a custom-made spatial structure and a custom-made interior design can be provided for end users or managers of the use space such an apartment house, an officetel room or a hotel room in

accordance with their taste.

Fig. 25 shows one embodiment of eco-friendly construction of the building in accordance with the present invention, in which all or a part of the respective households, rooms and/or public facilities to be formed in the building 74 are formed in various types including a Korean-style house, a traditional North American/European-style wooden house, an Oriental-style house, a ger, a bungalow, a modern Western-style house, a one-storied house, a two-storied house, etc., a connection passage is not a simple corridor passage, but is provided with a road, a roadside flower bed, a garden, a vegetable garden, a wall, a wooden fence, a live tree fence, an earth-floored room, a floor, a spring and a washing site 76 and so on, and an opening and shutting door, a window door, a paper window or the like used in a traditional house is provided between an indoor room and a living room or an outdoor space, or at least one eco-friendly and traditional facility such as an outshot, a garret or the like is formed in predetermined space, thereby making possible to strengthen eco-friendly ties, human ties, community-like ties, emotional ties in various way.

Industrial Applicability

In a multilevel road system in accordance with the present invention, a left-hand turn is rapidly and easily made by substituting a P-turn mode for a conventional grade separated crossing mode employed in each floor of an intersection building and requiring a

turn of 180° along a loop road.

Also, since road zone in which shopping street and office streets or residential area are closely packed along the multilevel road can be obtained by efficiently accommodating buildings on a rooftop floor of the multilevel road or by the multilevel road, a layout structure of the multilevel road can be variously patterned. Accordingly, areas other than the multilevel road can be utilized as a quiet residential area, a park with conveniences, a resort area, a farmland and the like or forests and rivers cab be preserved as a natural state, and a more eco-friendly and future-oriented planned urban can be designed.

In the drawings and specification, there have been disclosed typical preferred embodiments of the invention and, although specific terms are employed, they are used in only a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims

1. A multi-layer road system, comprising:

multilevel roads composed of at least two floors between which an inter-floor road is formed, respectively for securing parking spaces and living spaces, a planar layout structure of the multilevel roads comprising non-latticed type multilevel roads including opened and closed loops and being composed of a combination pattern in which the non-latticed type multilevel roads are connected with each other by linear and curved multilevel roads;

entry/exit buildings provided at each starting point of the multilevel roads and formed in a manner making it possible to run in at least one direction;

intersection buildings provided at each intersection point between the multilevel roads and formed in a manner making it possible to run in all of upper, lower, left-hand and right-hand directions and in such a manner capable of entry and exit between going-straight roads of the respective floors through loop roads and detour only roads, the detour only roads connecting the respective going-straight roads and the loop roads being provided with an left-hand turn only shoulder formed in a manner to enable a P-turn to the loop road through the only left-hand turn shoulder, elevation roads enabling vehicles to elevate from all directions being formed between the loop roads of the respective floors, and inter-floor connection roads being formed between the loop road and the inter-floor

road; and

intermediate entry/exit building so formed as to make it possible to enter the roads at the middle thereof and to run in two directions.

2. The multi-layer road system according to claim 1, wherein the planar layout structure of the multilevel roads is composed by a layout structure in which radiant lines and lines of at least two concentric circles or the like meet each other.

3. The multi-layer road system according to claim 1, wherein the planar layout structure of the multilevel roads is composed by a honeycomb structure consisting of a plurality of polygons.

4. The multi-layer road system according to claim 1, wherein the planar layout structure of the multilevel roads is composed by a ring structure in which a plurality of circular loops are connected each other by straight lines.

5. The multi-layer road system according to claim 1, wherein buildings are built on the top floors of the entry/exit buildings, the intersection buildings, the intermediate building and the multilevel roads and sides of the multilevel roads, respectively, and the plurality of buildings built on the top floor of the multilevel roads are so linked with each other that top surfaces thereof have a constant height and thus elevated runways

enabling a takeoff and landing of light flying vehicles are constructed over the building group.

6. The multi-layer road system according claim 1, wherein each of the first floor and/or the second floor of the multilevel road, entry/exit building, intersection building and intermediate entry/exit building render/renders track vehicles or mass transportations to pass thereon, and bus stops and platforms for track vehicles are selectively installed outside of the loop road in the first floor and/or the second floor of the entry/exit building, the intersection building and the intermediate entry/exit building, respectively.

7. The multi-layer road system according claim 1, wherein when a partial section of the multilevel road, the entry/exit building, the intersection building and the intermediate entry/exit building are divided into the floors by only the loop roads, respectively, a part of the loop road of the respective floors is formed in an arched shape to obtain a gateway in common use.

8. The multi-layer road system according claim 1, wherein in view of securing spaces on and above the ground of a partial section of the multilevel road, the entry/exit building, the intersection building and the intermediate entry/exit building, tracks for light vehicles are provided so as to maintain eco-friendly spaces.

9. The multi-layer road system according claim 1, wherein at least one of the entry/exit building, the intersection building and the intermediate entry/exit building is separately manufactured and then constructed independently or in combination with the others.

10. The multi-layer road system according claim 1, wherein facilities for common use including at least one household are totally or partially disposed in predetermined spaces of the entry/exit building, the intersection building and the intermediate entry/exit building.

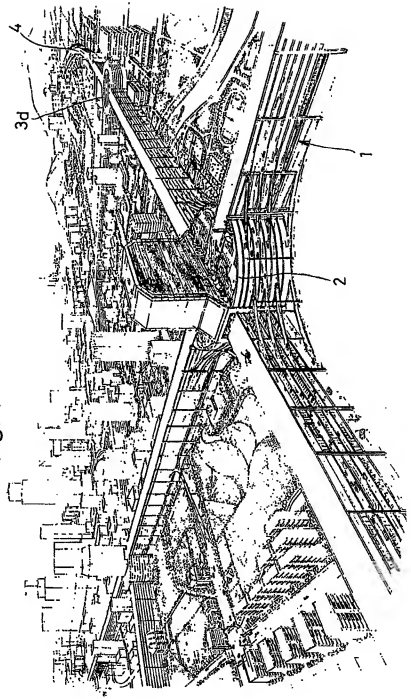


Fig. 1

Fig. 2

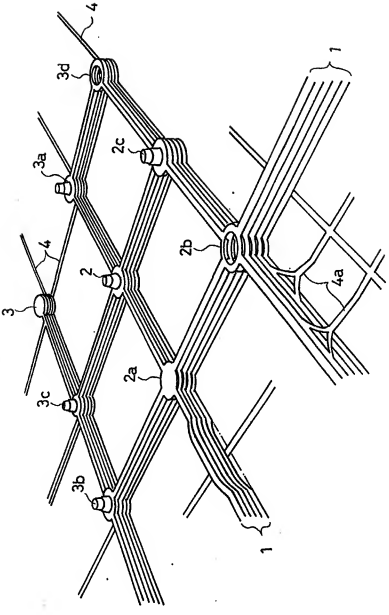


Fig. 3

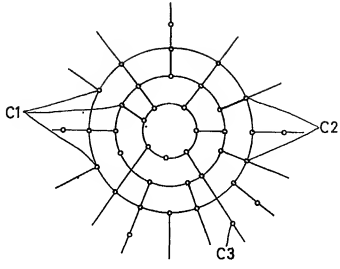


Fig. 4

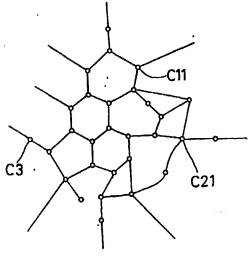


Fig. 5

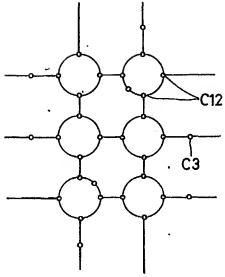


Fig. 6

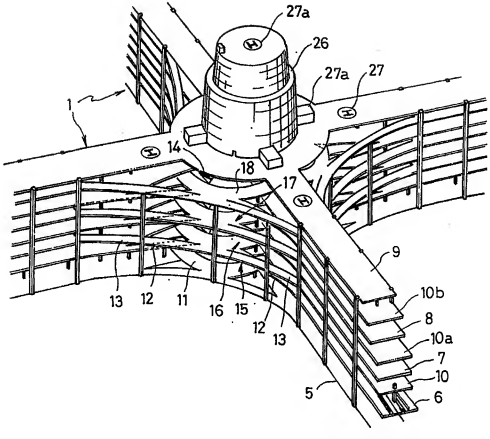


Fig. 7

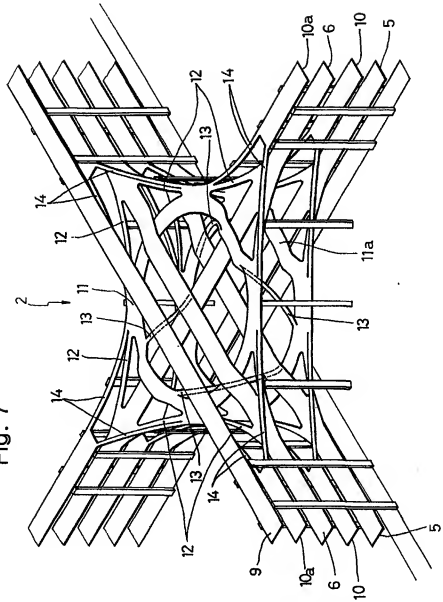


Fig. 8

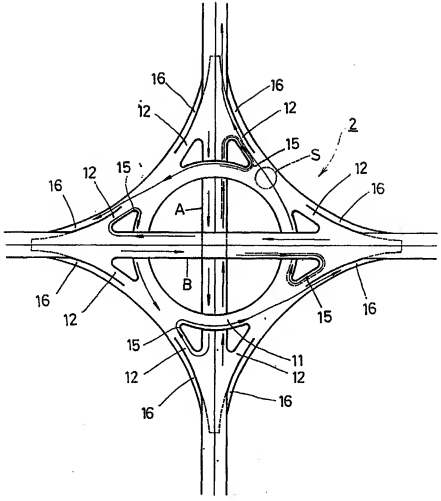


Fig. 9

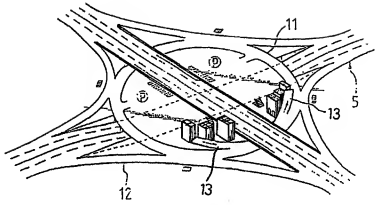


Fig. 10

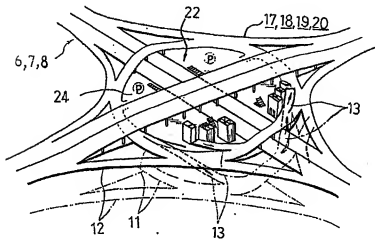


Fig. 11

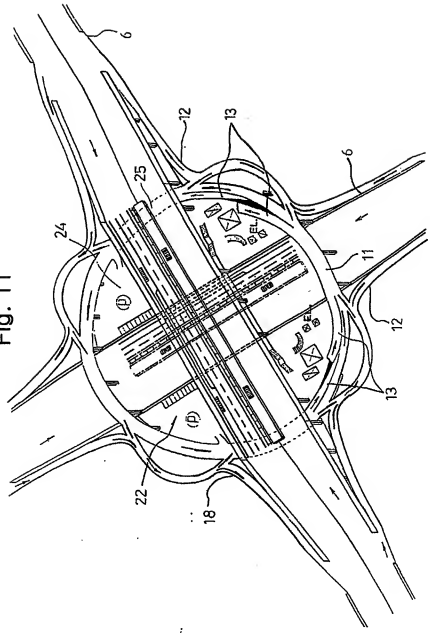


Fig. 12

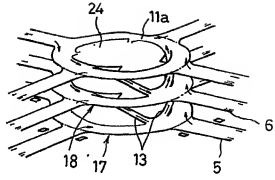


Fig. 13

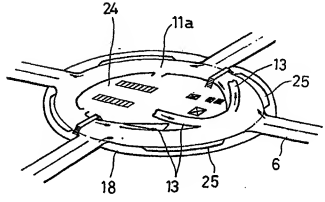


Fig. 14

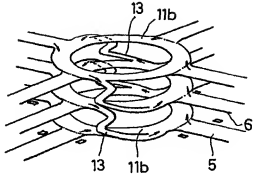
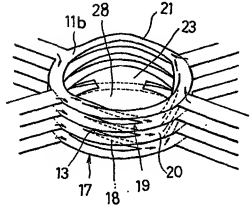


Fig. 15



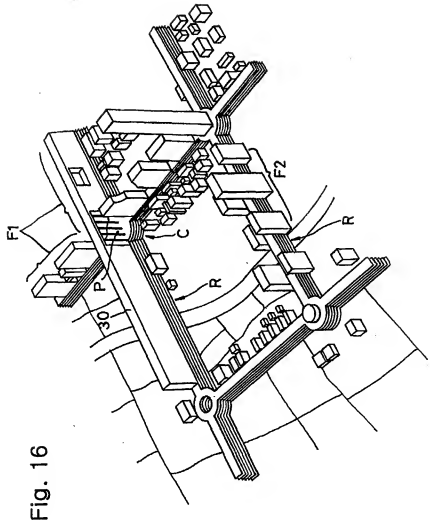


Fig. 16

Fig. 17

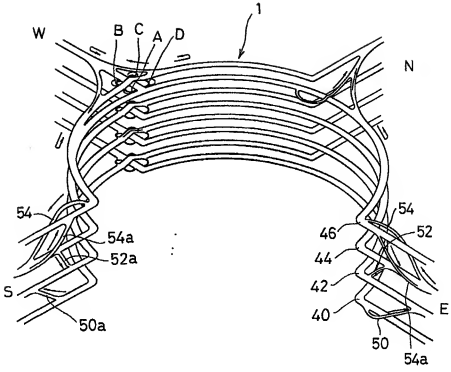


Fig. 19

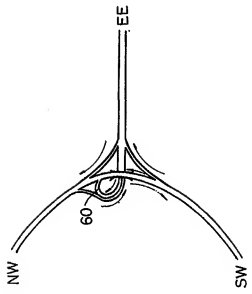


Fig. 18

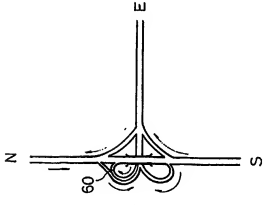


Fig. 20

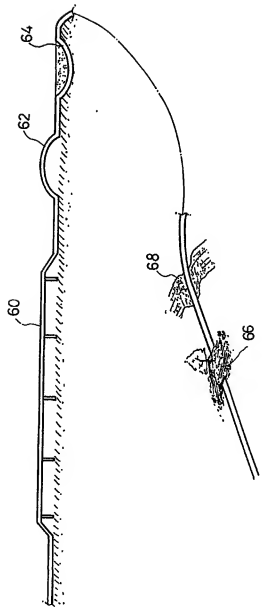


Fig. 21

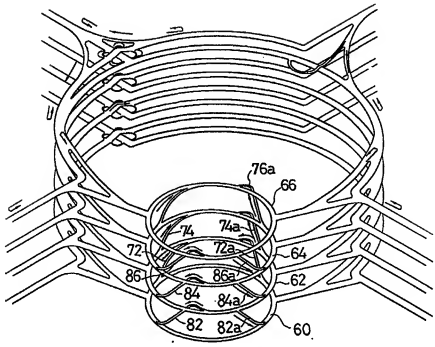


Fig. 22

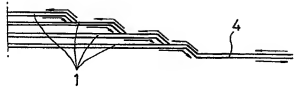


Fig. 23

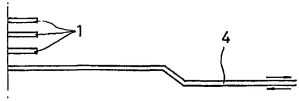


Fig. 24

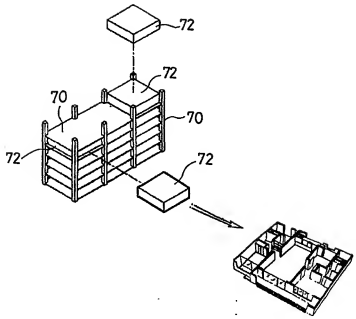
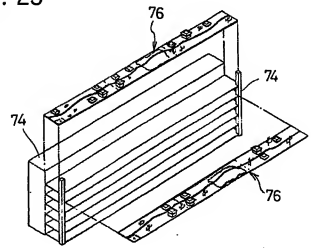


Fig. 25



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR00/00592

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 E01C 1/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 E01C 1/00, 1/02, 1/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fileds searched

Electronic data base consulted during the international search (name of data base and, where practicable, search trerms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 93-7544 B(OSAN CORP), 12 AUGUST 1993	1, 5-9
A	KR 96-37965 A(Lee, Jin Kuk), 19 NOVEMBER 1996	1
A	KR 94-20774 U(Lim, Myoung Chul), 17 SEPTEMBER 1994	1
A	JP 61-121203 U(Morita, Yoshi Show), 31 JULY 1986	1

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevence
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 MARCH 2001 (21.03.2001)	22 MARCH 2001 (22.03.2001)
Name and mailing address of the ISA/KR Korean Industrial Property Office Government Complex-Taejon, Dunsan-dong, So-ku, Taejon Metropolitan City 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer HWANG, Sung Ho Telephone No. 82-42-481-5806

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